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LOW DISPERSION SPECTRA OF GALAXIES. II.,

A. G. Davis Philip

Dudley Observatory and thr State University of New York at Albany

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Abstract

Low dispension spectra (=10,000 A/mm) have been obtained of the brighter members of the Hercules Cluster and Abell #2197 and 2199. The survey identifies the reddest and bluest galaxies in each cluster. Color-magnitude diagrams are drawn for each cluster.

Introduction

The preceding paper (Philip and Sanduleak, 1969) describes the crossed-prism survey of clusters of galaxies. This paper surveys galaxies in the Hercules Cluster and two clusters in Abell's catalogue (1958), numbers 2197 and 2199.

<u>Observations</u>

The observational data was obtained from two plates taken with the Warner and Swasey Coservatory Schmidt telescope. The plates are listed in Table 1.

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Table 1
Crossed Prism Plates
Warner and Swasey Observatory

Plate #	Object.	R A (19	962) Dec	Emulsion	Exposure	Date	·Remarks
6592	Hercules Cluster	<u>1</u> 6 03	17 54	IN	60 ^{min} 5	5 29/30 1962	2
6 595	Abell #2197,2199	<u>1</u> 6 27	39 48	IN	7.5 ^{min} 5	5 29/30 1 _. 962	Red end of spectra slightly out of focus.

The galaxies measured in the Hercules Cluster are listed in Table 2. The NGC number (or I.C. number if the number is followed by an asterisk) is listed in column 1, the right ascension and declination (1950) in columns 2 and 3, the composite color index in column 4 and remarks in column 5. All galaxies, to mag. = 15.5, from Zwicky and Herzog (1963) that fall in the area of the plate taken of the Hercules Cluster are listed in Table 2. Those galaxies without an index are followed by an explanatory remark in the remarks column.

The galaxies measured in Abell 2197, 2199 are listed in Table 3, following the same format as in Table 2. The positions and magnitudes are taken from Zwicky and Herzog (1966).

Discussion

The color-ragnitude diagram for the Herchles Cluster is presented in Figure 1. The diagram resembles that of the Coma Cluster, in that the brightest falaxies have the same spectral index, and the fainter galaxies have redder and bluer indices. There is another plot to the right of the Hercules C-M diagram which shows the C-M diagram for galaxies outside the irrediate area of the cluster. In appearance this plot is very different, being merely

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a scatter diagram, and is probably the result of the majority of these galaxies being field galaxies. In Figure 2 is shown a plot of the positions of the cluster galaxies. Solid triangles indicate the 8 reddest galaxies, hollow circles indicate the 6 bluest galaxies; and solid circles indicate the position of the remaining galaxies. As was noted in the Coma Cluster, the blue galaxies seem to be somewhat more centrally condensed in the cluster than do the reddest galaxies which are spread over a larger area of the celestial sphere.

The galaxies measured in Abell 2197 and 2199 are plotted in a colormagnitude diagram in Figure 3. In Zwicky and Herzog (1966) these two clusters are marked as cluster #12 on page 188. Figure 3 is divided into three sections. The first, on the left, plots all the measured galaxies that fell within the boundary marked in Zwicky and Herzog (1966) for cluster 12. The next two sections plot the color-machitude diagram for the clusters Abell 2197 and 2199. The contours of these clusters were transferred from a chart in Clark (1968) showing isopleths for each cluster. The isopleth representing 990 galaxies per square degree close on therselves these isopleths were and this isopleths were transferred to the chart in Zwicky and Herzog to rijde which galaxies would be chosen as belonging to each cluster. Only the brightest 1 1/2 magnitudes of the cluster members are being sampled in the color-magnitude diagrams. The diagrams for 2197 and 2199 are quite similar, in spite of the low statistical sample of galaxies in each diagram. The diagrams resemble that for the Coma Cluster more than that for the Virgo Cluster, therefore Abell 2197 and 2199 can be classified as regular clusters. A plot of the positions of the bluest and reddest galaxies in each cluster does . ot reveal any informatica due to the small number of malaxies in each sample. The malaxy

at $< = 16^{h} \cdot 26^{m} 8$, $\delta = 41^{\circ} \cdot 20^{\circ}$ is the bluest galaxy in either cluster. The image is diffuse, but it can definitely be classified as a blue object.

It should be noted that the indices from plate #6595 are much redder then those from the other plates. This occurs because the red ends of the spectra on this plate were slightly out of focus, thus making the red end appear more heavily exposed. The ordering of the galaxies by color is not disturbed by this effect.

It is hoped that further plates can be obtained of clusters within 100 mpc of the sun, such as the Perseus and Ursa Major Clusters. I wish to acknowledge the support of the Office of Maval Research.

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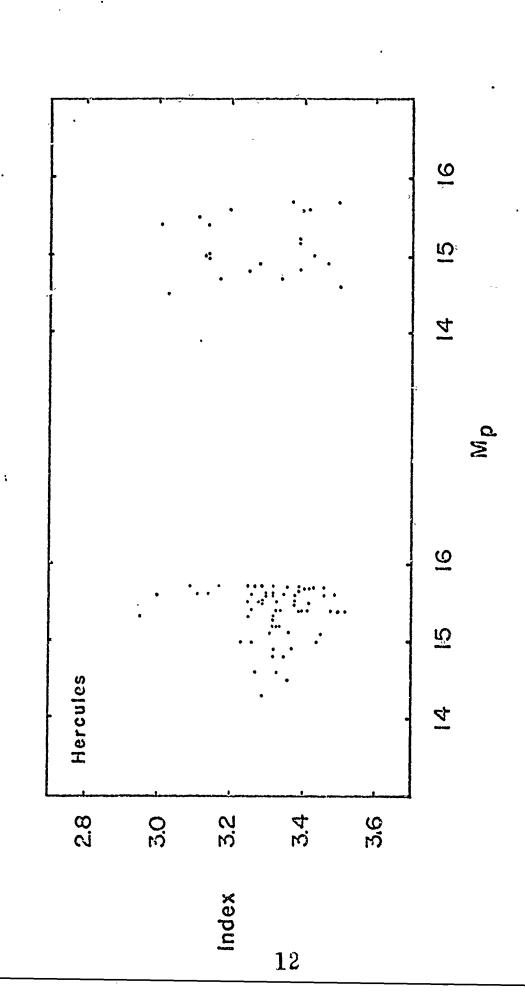
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Titles for Figures

- Fig. 1 Color-magnitude diagram for galaxies in the Hercules Cluster.

 The plot to the left is for galaxies in the cluster, the plot to the right shows galaxies surrounding the cluster.
- Fig. 2 Positions of the reddest and bluest galaxies in the Hercules Cluster. The solid triangles mark the eight reddest galaxies, the hollow circles mark the six bluest galaxies, and the solid circles mark the remainder.
- Fig. 3 Color-magnitude diagram for galaxies in Zwicky and Herzog's (1966) cluster #12, Abell 2197 and Abell 2199.



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